— A —

POCKET CATALOGUE

OF

Microscopes, Magnifiers, Microscopical Accessories, Mounting Materials, etc.,

ENTOMOLOGICAL AND BOTANICAL SUPPLIES.

SELECTED FROM OUR CATALOGUE B, 1892.

Containing also some Practical Notes and Reference Tables.

JAMES W. QUEEN & CO.,
Makers of the Acme Microscopes,
1010 Chestnut Street,
PHILADELPHIA.

We suggest that you preserve this book for reference. We think you will find the notes and tables to be of practical value, even though you may be expert in the use of the microscope.

The Microscopical Bulletin is a journal of which every number is full of interesting matter and practical notes. 25 cents per year. Sample copy free.

The new edition of our complete catalogue **B** *(of microscopes, accessories, etc.) will be sent on application.*

A

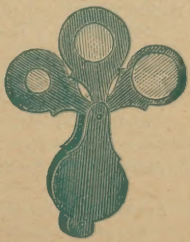
POCKET CATALOGUE

OF

Microscopes, Magnifiers, Accessories and Supplies, Plant Presses, Insect Pins, etc.

SIMPLE MICROSCOPES FOR BOTANICAL USE, ETC.

3019.



3022.

(**A convenient and simple rule** to determine the power of any simple microscope or single lens used as a magnifier is to divide ten (inches) by the focal length of the lens in inches. Thus, if a lens has 1 inch focus its power is 10÷1=10: if ½ inch focus the power will be 10÷½=20. When the lens is a thick one, or a system is made up of two or three single lenses, it is nearly accurate in determining the focus to take the measurement from the middle of the lens or system to the focal point. In taking such measurements with any lens, take the image of a distant object, not closer than about 30 feet.)

NO. PRICE.

3014 S. G. POCKET MAGNIFYING GLASS, hard-rubber case, oval-shape, 2 lenses, 11-16-in. diameter, each, ... 50

3014 G. Pocket Magnifying Glass, hard-rubber case, oval-shape, 2 lenses, 15-16-in. diameter, each, 65

3014½ G. Pocket Magnifying Glass, hard-rubber case, oval-shape, 2 lenses, 1 3-16-in. diameter; each, 85

(*We call attention particularly to the above three numbers, which we are able to offer at specially low prices in quantities.*

3019. Pocket Magnifying Glass, hard-rubber case, bellows-shape, 2 lenses, ½ and ⅝ in. diameter, each, ... 60

3020. Pocket Magnifying Glass, hard-rubber case, bellows-shape, 2 lenses, ¾ and ⅞ in. diameter, each, ... 75

3022. Pocket Magnifying Glass, hard-rubber case, bellows-shape, 3 lenses, ½ to ⅝ in. diameter, each, ... 80

3023. Pocket Magnifying Glass, hard-rubber case, bellows-shape, 3 lenses, ½ to ⅞ in. diameter, each, ... 1 00

(*On these we can also give reduced rates in quantities.*)

3027½. ACHROMATIC TRIPLET MAGNIFIER, of high quality, giving exquisite definition, in nickeled pocket case. This is made in 2 sizes, of either ¾ or 1 inch focus (powers about 14 and 10 respectively), ... 5 00

3035-S. CODDINGTON LENS, brass frame, about ⅝ in. equivalent focus, ... 1 00

(*To obtain the power in diameters in this and similar cases, divide 10 (inches) by the equivalent focal length (in inches); thus 10÷⅝=16 diameters.*

3040½.

3045.

NO.		PRICE.
3040½*a*.	CHARM MICROSCOPE, hard nickel mounting, 7-16-inch diameter, ⅞-inch focus; for student's use,	$ 25
3040½*b*.	CHARM MICROSCOPE, hard nickel mounting, 9-16-inch diameter, 1⅛-inch focus; for student's use,	35
3045.	TRIPOD MICROSCOPE, with screw adjustment for focus, double lenses; for varied use,	75
3056.	SCHOOL MICROSCOPE, a simple microscope with rack and pinion adjustment and powers ranging from 8 to 30 diameters; condensing lens, life box for insects, etc., forceps, watch-glass, plain slides, and one prepared object. In mahogany case, which forms a base for the instrument when in use,	6 00

COMPOUND MICROSCOPES.

3061.	HOUSEHOLD MICROSCOPE, compound, with powers ranging from 30 to 100 diameters; with forceps, glass sides, etc., in walnut case,	5 00
3073.	THE CONVENIENT CLASS MICROSCOPE, to be held up direct to the light, and thus used by each member of the class; has spring holder for object, with complete motion for adjustment; screw-clamp to prevent focus being altered when once set. Good achromatic lenses, giving powers of 45 and 80 diameters, glass slides, etc., in polished case,	12 50

"I found the Class Microscope even better than I had expected, and its workings entirely satisfactory.

"CHAS. T. MCCLINTOCK,
"Prin. School Biology, College Liberal Arts, (Chautauqua University.)"

NO.		PRICE.
3090.	THE PHYSIOLOGICAL MICROSCOPE; has two lenses, ½-inch and 1-5-inch, achromatic, the latter being of especially high quality, giving beautifully clear and brilliant definition. Has draw-tube, concave mirror, inclination-joint, and rack-and-pinion adjustment of excellent construction; and the lenses have the standard Society screw. The powers range from 25 to 440 diameters. In case, ...	$20 00

THE ACME No. 5 MICROSCOPE

Is an instrument of thorough construction, with adjustments smooth and perfect in action, the lenses being of especial excellence and clearness of definition.

We recommend this microscope as an efficient instrument for general school use, in showing the tissues of plants, circulation of blood, and multitudes of other interesting objects.

Simplicity, *strength*, and *solidity*, with low cost, are especially claimed for this microscope. The base is a heavy tripod, so proportioned that the microscope is very firm whether vertical or inclined.

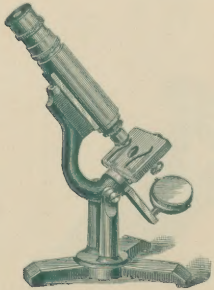
A revolving diaphragm and large concave mirror with complete motions, are mounted beneath the stage. For additional illumination of opaque objects, the mirror may be swung above the stage.

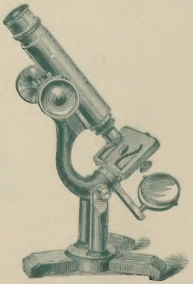
By means of the draw-tube, the full English tube-length of ten inches may be obtained.

The plan of constructing the fine adjustment has the following invaluable features which especially fit it **for classwork in laboratories of high schools and colleges:**

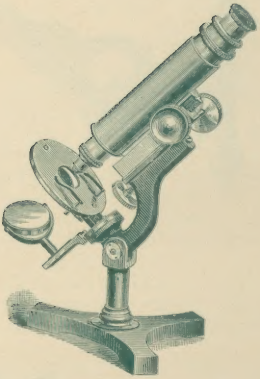
First (and principally). Perfection of action; the upper plate carrying the object must respond instantly to the movement of the screw, upward by positive action, downward by the spring of the plate; and without any lateral or side motion; these, of course, are the essential features of a good fine adjustment.

Second (and important). This perfect action will continue as at first; as there are no joints to wear loose or become strained, there can be developed no lost motion nor lateral motion, by wear or rough handling, all excepting the screw being made practically one solid piece.





ACME NO. 5 MICROSCOPE.



ACME NO. 4 MICROSCOPE.

Third. It is inexpensive in construction.

(An objection is sometimes made that one side of the stage-plate is moved while the other is not, thus elevating the one side more than the other. We only ask those to whom this may appear to be an objection to make a practical and careful test. They will find that the motion is true and direct, free from the slightest displacement, as the range of motion required is very slight; at mid-range the stage-plate is strictly horizontal.)

It has society-screw, and is furnished with good 1-inch and 1-5-inch objectives, and one Huyghenian eye-piece, in upright case with handle. Powers range from 40 to 350 diameters; the 1-5-inch is a lens of such good definition (and aperture) that it will resolve *P. angulatum.*

We are constantly receiving opinions complimentary to the workmanship and the clearly defining qualities of our Acme Microscopes, and shall be glad to send copies of some of these letters on application.

NO.		PRICE.
3118.	ACME No. 5 MICROSCOPE, with SLIDING-TUBE adjustment for quick motion, 1-inch and 1-5-inch objectives, one eye-piece; in case, ...	$28 00
3119.	ACME No. 5 MICROSCOPE, with RACK-AND-PINION of very perfect construction, instead of the sliding-tube adjustment; in case, ...	35 00
3120.	EXTRA EYE-PIECE, to increase power to 500 diam.,	3 00

Within the few years since their introduction, these excellent instruments have found place in the laboratories of many colleges, high-schools, etc., and have been accorded hearty and wide-spread commendation.

THE ACME No. 4 MICROSCOPE

Is now such a standard and favorite instrument that but little description is necessary. It is easily manipulated, and is adequate to do work of a very high grade with lenses of the most extremely high power.

The position of the fine adjustment, which was a "new de-

☞ Please refer to note on second page of cover.

parture," has been found to be one of great convenience; it is of great delicacy and truth of motion in the axis and will focus a 1-20th inch objective, or higher, with perfect ease and exactness. Wear can readily be taken up.

The excellent features of this instrument enable us to recommend it especially for the use of physicians, as well as of students in medicine and biology. We also recommend it to the attention of teachers of natural science in our high schools, etc., as an instrument well fitted for such work.

The body-tube is 6½ inches long and may be increased, by means of the draw-tube, to the standard length of 10 inches, or over; it takes eye-pieces of 1¼ inches diameter, thus giving the advantage of a large field. The draw-tube has society-screw for attachment of amplifier, etc. The rack-and-pinion movement is of such steadiness and delicacy that a 1-5-inch objective may be easily and accurately focused. The mirrors, plane and concave, are mounted to slide (to or from the object) upon the radial mirror-bar, which turns about the object as a centre; for the illumination of opaque objects the mirror may be thrown above the stage; when in a central (axial) position the mirror-bar is caught by a spring stop. The stage is circular, with a central aperture, into which screws the tube for carrying accessories, (such as polarizing apparatus and various other kinds of illuminating apparatus); and it is a stand worthy of receiving such additions.

The diaphragm for regulating the light is mounted upon a new plan which has the merit of great convenience; it is upon a hinged arm, which may be instantly swung completely aside, when oblique light is desired, or for the attachment of accessories. A spring stop brings each opening nicely central.

The spring-clips are made in such a way that under them the slide may be moved with perfect ease and smoothness. The eye-pieces have removable caps.

We are constantly receiving opinions complimentary to the workmanship and the clearly defining qualities of our Acme Microscopes, and shall be glad to send copies of some of these letters on application.

☞ Please refer to note on second page of cover.

NO. PRICE.

3122. ACME No. 4 MICROSCOPE, with two eye-pieces, 1-inch (15°) and 1-5-inch (105°) objectives, giving range of powers from 40 to 500 diameters; in walnut case with drawer and lock, ... $55 00

N. B.—The 1-5-inch objective, as supplied with these instruments, is one of superior beauty of definition, and brilliancy and strength of 'resolution' (grasp or power of showing delicate structure).

3122½. ACME No. 4 MICROSCOPE, with

2-inch eye-piece, as in 3122;
1-inch do do
2-in. objective, to give low power with large field;
1-inch objective, as in 3122;
1-5-inch do do

} range of power from 20 to 500 diameters

Bull's-eye condenser on stand;
Polarizing apparatus with selenite;
Beale's camera lucida, for drawing;
Stage micrometer, 100 and 1,000 per inch;
Eye-piece micrometer;
Spot-lens for dark ground illumination;
Zoophyte trough for water plants, etc.;
Life-box for animalculæ, insects, etc.;
Stage-forceps;
Fine-pointed steel forceps, nickel-plated;
The above accessories are all neatly fitted into the case. Price, complete, ... 95 00

3122½*a*. ACME No. 4 MICROSCOPE, with

2-inch eye-piece, as in 3122
1-inch do do
3-5-inch objective, as in Acme No. 3;
1-5-inch do as in 3122;
1-15-inch do oil-immersion, 1.25 N. A., no. 3182;
Sub-stage condenser, No. 3530, but mounted with sliding adapter No. 3435.
The power ranges from about 60 to 1,400 diameters; the condenser will give abundant

☞ Please refer to note on second page of cover.

NO.		PRICE.
	illumination up to the highest power, and is an important addition. The objectives are all of very superior quality of correction, giving beautiful and sharp definition. In case complete, ...	$111 00
3139.	MOVABLE OBJECT CARRIER, fitting on stage of Acme No. 4, ...	1 75
3155½.	GLASS STAGE PLATE, square (Zentmayer form), with stop for Maltwood finder, fitted to No. 4, with adjustable ivory point to regulate pressure, ...	5 00

ACME No. 3 MICROSCOPE, NEW MODEL.

The entire microscope is of brass, highly finished, and of the most perfect workmanship. The body may be set at any angle of inclination most convenient.

The rack and pinion adjustment has a long range, and is of the most perfect smoothness and delicacy of action. The fine adjustment is a very delicate and truly-working one, suitable for the highest powers. The body is firmly carried upon rollers, and is moved by a lever actuated by a screw at the rear of the arm. The head of screw is graduated.

The stage has complete rotation. The rotating plate is removable, and an extra pair of spring clips is furnished to use with the fixed stage.

The sub-stage is movable on the mirror bar, is of the guage most usually adopted, and carries an adapter having society-screw. To this is screwed an iris diaphragm, conveniently shaped liked a short objective, for regulating the amount of light to a nicety. This may be placed close to the object, or at any required distance.

The mirrors plane and concave are also adjustable on the mirror bar; the mirrors, when in their usual position, rest at the focal distance of the concave from the object, an apparently small point, but in reality a very important one. Mirrors alone, or with the sub-stage, may be swung obliquely, or above the stage. A graduated disk back of the stage registers the degree

☞ Please refer to note on second page of cover.

of obliquity, and may be used for the measurement of angular aperture.

Both the stage and sub-stage are susceptible of centering adjustments, by loosening the capstan-head screws which hold them in position, centering by hand, and tightening again by a steel key furnished with the instrument.

Wear of moving parts is provided for throughout.

This is an instrument which we can recommend as being well adapted for work of even the very highest grade, as, for example, bacteriological investigations (which require the highest power lenses, with suitable illuminating apparatus, and a stand having accurate adjustments for both.)

Some recent features of design—as applied to this instrument—are: *1st*, a stop, or click, into which the mirror bar falls when centrally placed, or at zero; *2nd*, a knife-edge, or index, for more accurate reading of scale on fine adjustment screw head; *3d*, the latter is made with a doubled milled edge, between which a cord may be run for focusing when the microscope is used for photography (for which it is well adapted).

We are constantly receiving opinions complimentary to the workmanship and the clearly defining qualities of our Acme Microscopes, and shall be glad to send copies of some of these letters on application.

NO.		PRICE.
3124.	ACME No. 3 MICROSCOPE, iris diaphragm, two-inch ocular; in walnut case with drawer, . .	
3176½.	3-5-IN. OBJECTIVE, 30° aperture, power from 75	$83 00
3178.	1-5-INCH do 105° do to about 625	
3134.	1-INCH EYE-PIECE, diameters.	

The objectives as supplied in this outfit are of beautiful correction, being the same as in special outfit No. 3122 1-2a.

3126.	CENTERING ADJUSTMENT to the sub-stage by levers, (Pennock's device), very quick in action, additional, ...	7 00
3159.	ACME No. 3 MICROSCOPE, iris diaphragm, (No. 3124), with the following outfit, which we especially recommend for fine work in bacteriology, etc.;	

NO.		PRICE.
	Extra eye-piece, (two in all, 2-inch and 1-inch);	
	3-5-inch objective, No. 3176½;	
	1-5-inch do No. 3178;	
	1-15-inch do homogeneous-immersion, 1.30 N. A., No. 3181;	
	Sub-stage condenser, being the same lens-system as used in No. 3530, with diaphragms; (The range of powers obtained is about 75 to 1,600 diameters).	
	In walnut case with drawer, ...	$150 00

The New Acme Continental Microscopes.

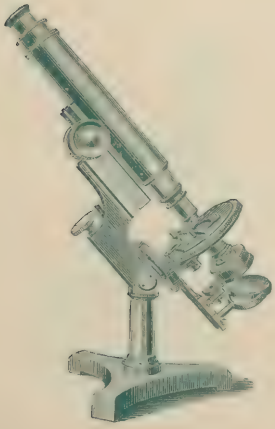
These are now made in two styles, being modifications of the original pattern. *Their workmanship and fitting are of the finest, and are guaranteed to be perfect in every respect.* They are not offered as cheap instruments, nor to compete with cheap instruments.

B, CHIEFLY FOR PROFESSIONAL USE.

The instrument is brass throughout, of the most perfect finish. The rack-and-pinion movement is, of course, the ACME of perfect fitting and smooth working. The fine adjustment slide works upon a triangular pillar of large size and great solidity and firmness, wear being provided for. The large screw-head is silvered and by the index reads to the 1-100oth part of a centimeter.

The draw-tube is graduated to millimeter spaces, reading at a glance the total length of tube. The stage is very large and solid.

The sub-stage (for carrying accessory apparatus), is solidly mounted upon a bar upon which it slides. The very large plane



ACME NO. 3 MICROSCOPE.

ACME CONTINENTAL MICROSCOPE

PATTERN I.

and concave mirrors (the latter of proper curvature to focus upon the object), are mounted in a very neat manner, being adjustable to or from the object on an independent slide; they are also provided with an arm (1¾ inches long) by which they may be instantly swung aside for oblique illumination or to allow the complete removal of the sub-stage.

NO. PRICE.

3160. THE PROFESSIONAL ACME CONTINENTAL MICROSCOPE, with iris diaphragm (objective-shaped, with standard screw; with 1½-inch ocular; 1-inch ocular; 3-5-inch objective, no. 3176½; 1-7-inch objective, no. 3179 (power ranges from about 50 to 500). In compact oak case, . . . $90 00

3161. THE PROFESSIONAL ACME CONTINENTAL MICROSCOPE, with iris diaphragm and 1½-inch ocular; 1-inch ocular; 3-5-inch objective, no. 3176½; 1-5-inch objective, no. 3178; 1-15-inch oil-immersion objective, no. 3182; power ranges from about 50 to 1,200); sub-stage condenser, no. 3530. In oak case, ... 141 00

(These outfits, nos. 3160, 3161, are admirably suited for physicians' use, the latter being especially excellent for bacteriological work; the former, however, will even show the tubercle bacillus with great clearness.)

I, CHIEFLY FOR STUDENT'S USE.

This instrument is precisely the same as pattern B, excepting only in the following particulars: The base is of iron, having dead-surface finish in either pearl, dark olive, or black. The mirror and sub-stage tube are more simply mounted, as shown in illustration; the former is mounted on a long swinging arm, and the latter is entirely removable laterally.

3163 THE STUDENTS' ACME CONTINENTAL MICROSCOPE, with disc diaphragms (instead of the iris), and 1½-inch ocular; 1-inch ocular; 3-5-inch objective, no. 3176½; 1-7-inch objective, no. 3179 (power ranges from about 50 to 500). In stained case, ... 75 00

ACHROMATIC OBJECT-GLASSES.

SOME FAVORITE LENSES SELECTED FROM THE "QUEEN" SERIES.

Thoroughly recommended as lenses of high excellence. The 1¾-inch objective is highly satisfactory for use where a large field is required, giving a brilliant general view, especially valuable for opaque objects in general. The 3-5-inch is of ample aperture, giving brilliant illumination, sharpness of definition, and flatness of field. The 1-5-inch and 1-7-inch are lenses of large aperture, with great clearness and brilliancy of definition, and beautiful resolving power.

3181, 3182.

NO.							PRICE.
3175.	1¾-inch focus, 13 degrees aperture nearly . .					.	$7 00

"THE 1¾-inch is a most remarkable objective for the price."—B. F. QUIMBY.

"THE 1¾-inch objective reached me in safety. I am surprised by its excellence. You may well boast of it."—ALFRED C. STOKES.

3176½.	3-5	do	30	do	do	do	. . . 8 00
3178.	1-5	do	105	do	do	do	. . . 15 00
3179.	1-7	do	120	do	do	do	. . . 17 00

Though so moderate in price, we can recommend these lenses very highly for admirable performance and clearness of definition.

3181. 1-15-INCH OIL-IMMERSION OBJECTIVE, 1.30 N. A., 60 00

☞ Please refer to note on second page of cover.

Our 1-15-inch oil-immersion objective has now a wide reputation as a lens of the very highest class, suitable for work on the minutest bacteria, resolving easily and beautifully the highest diatom tests. *Send for a special circular of this lens.*

We are now prepared to supply an oil-immersion lens of lower aperture (1.25 N. A.), and of excellent performance, at the extremely low price of $45.00

NO.		PRICE.
3182.	1-15-INCH OIL-IMMERSION OBJECTIVE, 1.25 N. A.,	$45 00

IF YOU ADMIRE fine performance in high-power lenses, send 15 cents in stamps for Dr. Detmer's photograph of *Amphipleura pellucida*, made with Queen's 1-15 inch oil-immersion lens, 1.30 N. A.

IF YOU ARE INTERESTED in bacteriology, send 15 cents in stamps for a photograph of *tubercle bacillus*, made by Mr. Ives, using our 1-15 inch oil-immersion lens, 1 30 N. A.

A bottle of immersion-fluid, with cap and rod-stopper, is supplied with each objective.

ACCESSORY APPARATUS.

3439.	AMPLIFIER, achromatic, to increase the power of any objective, ...	6 50

(*Although lower in price than others, we especially recommend this for the perfection of its correction.*)

3445.	CAMERA-LUCIDA, for drawing objects, Beale's neutral tint, ...	2 50
3453.	COMPRESSOR, Wenham's form, ...	1 50
3455.	CONDENSER, bulls-eye, powerful, for illumination of opaque objects, stand brass, ball-and-socket joint, extension rod, etc., lens 1½-inch diameter, ...	5 00
3456.	CONDENSER, on large brass stand, bulls-eye lens, 2½ inches diameter, ball-and-socket joint, extension rod, etc., ...	8 50
3463.	EYE-SHADE, Pennock's, for use with monocular microscope; (see note on p. 25,)	1 00
3465.	FROG-PLATE, for showing circulation of the blood,	1 00

NO. PRICE.

3478. LAMP, THE ACME, for microscopic work; has adjustable shade carrying best bulls-eye lens, etc., ... $1 75

3479. LAMP STAND, for the above, having all adjustments to raise, lower, or incline the lamp, adapting it admirably for the illumination of opaque objects, ... 1 75

3480. GROUND-GLASS, for Acme Lamp, with cap, . . . 50

3481. BLUE TINTED GLASS, for Acme Lamp, ... 25

3490. LIFE BOX, or animalcule cage, medium size, . . 2 00

3498. MICROMETER (Eye piece Micrometer), ruled on glass disc. Fitted to any eye-piece, ... 3 50

3499. MICROMETER, (Ramsden's Eye piece Micrometer), having fine screw with divided head; of most perfect workmanship and delicacy of action, for the finest and most accurate measurements. Fitted to any microscope, ... 35 00

3500. MICROMETER, ruled on glass slip, 3x1 inch, (Stage Micrometer), divided to 1-100 and 1-1000-inch spaces, ... 1 25

3503½. NOSE-PIECE, "Facility," for quickly changing objectives; with rings for 4 objectives, . . . 6 00

3504. NOSE-PIECE, double, for instantly changing objectives; angular form, ... 5 00

3505. NOSE-PIECE, triple, angular, ... 12 00

NOTE.—*We ask special attention to the fine finish, close fitting, and* ACCURATE CENTERING *of our double and triple nose-pieces.*

3508. POLARIZING APPARATUS; rotating polarizer, removable selenite, and analyzer. Suitable for Acme No. 4, or Continental 1; the prisms are of the finest quality, ... 11 00

3509. POLARIZING APPARATUS; the prisms are of finest quality, larger than in 3508; suitable for Acme No. 4, No. 3, or Continental, ... 13 50

3509½. POLARIZING APPARATUS; both polarizer and analyzer have rotating motion. The prisms are of finest quality, larger than in 3509; es-

NO. PRICE.

pecially suitable for the Acme No. 3, or Continental B, ... $18 00

NOTE.—*The above styles of polarizing apparatus have the short analyzer, adapting them equally well for use with the binocular microscope.*

3517. REVOLVING MICROSCOPE TABLE; polished walnut top; heavy base, with casters; may be adjusted to revolve at any height or may be rigidly clamped in any position; highly recommended, 12 00
Crating for shipment, ... 85

3525. SPOT LENS, for dark-ground illumination, for Acme No. 4. No. 3, or Continental, ... 4 00

3530*a*. SUB-STAGE CONDENSER, Queen's universal; a dividing system, with diaphragms, for use with both high and low powers; has society screw, and is suitable for use on the Acme No. 3, or Continental B, ... 7 00

3435. SLIDING ADAPTER for above, rendering it suitable for use on the No. 4, or Continental I, add'l, 1 00

3532½. SUB-STAGE CONDENSER, 'Abbe' (1.40 n. a.); sliding diaphragm-holder, with 5 stops, with revolving and de-centering motions. Will fit sub-stage of Acme No. 3, or the Continental with movable sub-stage, B, ... 16 00

3533½. SUB-STAGE CONDENSER, 'Abbe,' with lens-system of 1.20 n. a., ... 14 00

3540. ZOOPHYTE TROUGH, small size, plain, ... 60

Materials and Apparatus for use in Preparing and Mounting Objects.

GLASS SLIDES AND COVERS.

3681. GLASS SLIPS, 3X1 in., crown, smooth edges, per doz., 20; per gross, ... 2 00

3681*a*. GLASS SLIPS, 3X1½ in., crown, smooth edges, per doz., 30; per gross, ... 3 00

☞ Please refer to note on second page of cover.

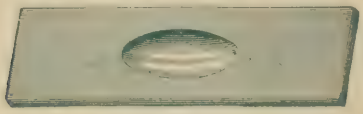
NO. PRICE.

3681*b*. GLASS SLIPS, 1⅞x1⅛ in. crown smooth edges, per doz., 25c.; per gross, ... $2 50

3683. GLASS SLIPS, 3x1 in., fine quality, extra thin (1-24 in. thick), per doz., 25c.; per gross, ... 2 50

3683½. GLASS SLIPS, 3x1 in., 1-24 in., thick, "extra white," per doz., 30c.; per gross, ... 3 00

3687. GLASS SLIPS, 3x1 in., with round concave centres, for examination of liquids, per dozen, . . . 75



3687½.

3687½. GLASS SLIPS, like 3687, but with oval concavities, per dozen, ... 1 00

3694. THIN GLASS COVERS, SQUARE, No. 3, per doz., 15; per oz., ... 1 00

3695. THIN GLASS COVERS, SQUARE, No. 2, per doz., 18; per oz., ... 1 50

3695*a*. THIN GLASS COVERS, OBLONG (rectangular), No. 2, regular stock sizes, per oz., ... 1 50

3696. THIN GLASS COVERS, SQUARE, No. 1, per doz., 20; per oz., ... 2 00

3697. THIN GLASS COVERS, CIRCLES, No. 3, per doz., 18; per oz., ... 1 50

3698. THIN GLASS COVERS, CIRCLES, No. 2, per doz., 20; per oz., ... 2 00

3699. THIN GLASS COVERS, CIRCLES, No. 1, per doz., 25; per oz., ... 2 75

☞No. 3, 1-70 to 1-100 in. thick; No. 2, 1-100 to 1-140 in.; No. 1, 1-140 to 1-200 in.

STAINING FLUIDS.

Hæmatoxylin; Ammonia-Carmine, Beale's; Borax-Carmine; Alum-Carmine; each per ounce bottle, . . . 25

☞Please refer to note on second page of cover.

NO.		PRICE.
	Eosin; Gentian Violet; Bismarck Brown; Aniline Violet; Methyl Blue; Methyl Green: Iodine Green; Fuchsin; each, per ounce bottle,	$ 20
	Burrill's Stain, for *Bacillus tuberculosis*, with directions, per ounce bottle,	35

DRY STAINS.—TO BE DISSOLVED AS REQUIRED FOR USE.

Most, or all are soluble in water, and will make a strong solution if used in proportion of 10 grains to the ounce.

Borax-Carmine,	per vial,	½	drachm,	15
Carminic Acid,	do.	½	do.	20
Carminate of Soda,	do.	½	do.	50
Picro-Carmine,	do.	½	do.	25
Sulph-Indigotate of Soda,	do.	¼	do.	20

Bismarck Brown; Eosin; Fuchsin; Gentian Violet; Magenta Red; Methyl Green; Methyl Violet; Methyl Blue; Vesuvin; per vial, 1 drachm, 15

Iodine Green, per vial, ½ drachm, 20

MOUNTING MEDIA, CEMENTS, ETC.

CANADA BALSAM, paper filtered, in flexible tubes, each,	25
do. do. hardened, and dissolved in benzole, chloroform, or xylol, per bottle, 1 oz.,	50
DAMAR AND BALSAM MOUNTING MEDIUM, per bottle, 1 oz.,	50
GLYCERINE, pure, per bottle, 1 oz.,	25
GLYCERINE AND CAMPHOR-WATER, per bottle, 1 oz.,	25
GLYCERINE JELLY, do do.	50
FARRANT'S GLYCERINE AND GUM MOUNTING MEDIUM, per bottle, 1 oz.,	50
OIL OF CLOVES, light in color, per bottle, 1 oz.,	35
ALCOHOL, 95 per cent, deodorized, per bottle, 2 oz.,	15
ALCOHOL, absolute, do. 2 oz.,	20
BENZOL, chem. pure, do. 2 oz.,	20
XYLOL, do. do. 2 oz.,	20
ANILINE OIL, (pure aniline), do. 1 oz.,	20

☞ Please refer to note on second page of cover.

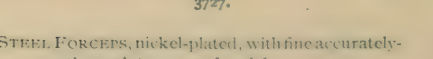
PRICE.

OSMIC ACID, 1 gram (1-32 ounce), in glass capsule, . . $2 00
OSMIC ACID, ¼ do. (1-64 ounce), do do. . . 1 25
FORMIC ACID, pure, 25 per cent.; per bottle, 1 oz., . . .20
BRUNSWICK BLACK, with brush in cork, per oz. bottle, . .25
ASPHALTE, do do do . 25
GOLD SIZE, do do do . 25
MARINE GLUE, fluid, with brush, do . 35
MARINE GLUE, do colorless, with brush, do . 40
SHELLAC CEMENT, do. do. . 40
BROWN CEMENT, transparent, with basis of shellac, flows smoothly and is recommended; with brush, per ounce bottle, ... 40
WHITE ZINC CEMENT, with brush, per ounce bottle, 50

INSTRUMENTS AND SUNDRIES.

3725*a*.

3725*a*. FORCEPS, self-closing, opening by pressure, for holding cover-glasses, flowers in analysis, etc., of steel, nickel-plated, ... 35
3726. BRASS FORCEPS, 3¼ in. long, straight, ... 15



3727.

3727. STEEL FORCEPS, nickel-plated, with fine accurately-meeting points; a good article, ... 40
3728. STEEL FORCEPS, 4 inches long, nickel-plated, finely finished, straight, ... 75

☞ Please refer to note on second page of cover.

NO.		PRICE.
3729.	STEEL FORCEPS, 4 inches long, nickel-plated, finely finished, curved,	$ 75
3732.	STEEL FORCEPS, 4 inches long, nickel-plated, same style as 3728, but heavier, and with serrated points, for anatomical dissection,	50
3991.	STEEL FORCEPS, a cheaper article than 3732,	25
3733½.	TROWEL or LIFTER, for transferring sections, etc., to slide with thin, small blade at end for centering objects, removing bubbles, etc.,	50
3734.	SCISSORS, very delicate, straight points, finest qual.,	1 25
3735.	Do. do. curved do. do.	1 25
3736.	Do. do. elbow do. do.	1 25
3737.	Do. not as fine as 3734, but good and efficient, especially offered for student's use in laboratories, straight,	50
3739 to 3742.	DISSECTING KNIVES or SCALPELS, finest quality, each,	65
3739*a* to 3741*a*.	SCALPELS, larger than 3739, 3740, 3741, same shape and quality, each,	50
3747.	NEEDLE HOLDER, with binding screw,	10
3747½.	CASE OF DISSECTING INSTRUMENTS, including 2 scalpels, cartilage knife, hook, forceps, chain with hooks, tracer, and scissors,	3 00
3748*b*.	INJECTION SYRINGE, nickel-plated, with four pipes and two stop-cocks, in morocco case,	9 00
3748*e*.	CARMINE INJECTING-GELATINE, hard, for dissolving, per oz.,	1 00
N3715.	WATCH GLASSES, flat bottom, per doz.,	40
N3715*a*.	WATCH GLASSES, rounded ordinary form, per doz.,	25
N3717.	DROPPING TUBES, with rubber bulb, each,	05
N3718.	CAPPED BOTTLE, for holding mounting fluids, re-agents, etc., 1½ ounce capacity,	30
N3718*a*.	Same, with rod-stopper,	40
N3719.	DROPPING BOTTLE, with glass bulb stopper, ⅔ ounce capacity,	20
N3724.	WIRE COMPRESSORS, nickeled, for holding down thin covers in mounting specimens, per dozen,	40

☞ Please refer to note on second page of cover.

NO.		PRICE.
N3729.	THE COMFORTABLE TURN-TABLE, with hand-rest projecting over the revolving plate; is practically a "self-centering turn-table,"	$2 75
N3735.	WRITING DIAMOND, for marking slides, . . .	1 75
N3736.	WRITING DIAMOND, with lathe-turned point, and reversible nickel-plated handle, ...	3 25
N3750.	RAZOR, ground flat on one side, for section-cutting, keenly honed, ready for use, ...	1 25
3752*b*.	SECTION INSTRUMENT, simple form, with well, having large flange top or table, and screw with divided head, ...	2 75
3752½. and 3752½*a*.	SECTION INSTRUMENT, with glass top and clamp, for edge of work-table, adopted for cutting hard or soft tissues (by clamping or embedding), ...	9 25
3764.	DISH WITH TRIPOD, for heating paraffin; may be used with Bunsen burner, or spirit-lamp, . .	45
3766.	WATER-BATH AND OVEN, for heating paraffin and slides; made of planished copper, ...	7 00
PARAFFIN,	either of 49 C., 52 C., or 55 C. melting point, per lb., ...	25
CELLOIDIN,	per ounce, ...	1 00
3776.	ADHESIVE LABELS, square, with border, assorted colors, per 100, ...	20
3777.	ADHESIVE LABELS, round or oval, plain white, per box of 100, ...	10

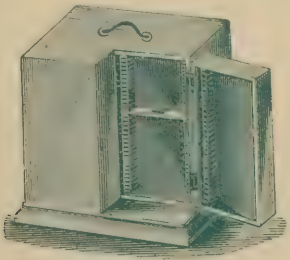
OBJECT CABINETS AND BOXES.

3804.	OBJECT BOX, the best made, for 25 slides, space for each slide numbered, with index, each 10c.; per doz., ...	1 00
3804*a*.	OBJECT CABINET, of polished cherry, containing 10 boxes, 250 slides, ...	3 00
3804*b*.	OBJECT CABINET, containing 20 boxes, for 500 slides, ...	4 00
3805½.	CLOTH-COVERED OBJECT BOX, for 25 slides, with lid, index, and sliding cover, ...	35

☞ Please refer to note on second page of cover.

NO. PRICE.

3805½*a*. POCKET OBJECT CASE, cloth-bound, with 4 trays, holding 24 slides, ... $ 50



3809.

3809. OBJECT CABINET, very compact, with racks; holds 200 slides, shellacked walnut, brass handle, 4 50

3809½.

3809½. OBJECT CABINET, of different construction, very compact, holds from 200 to 400 slides (according as used), shellacked walnut, brass handle, . . 5 00

☞ Please refer to note on second page of cover.

NO.		PRICE.
3810½.	OBJECT CABINET, of polished mahogany, with 17 drawers, holding 1250 slides on raised ledges, panel door, with lock, ...	$16 00
3811½.	OBJECT CABINET, of polished mahogany, with 15 drawers, holding 600 slides on raised ledges, folding glass-panel doors, with lock, ...	24 00

FIRST-CLASS MICROSCOPIC OBJECTS.

A SERIES of 24 ANATOMICAL Preparations; mostly stained or injected, ...	15 50
A SERIES of 24 BOTANICAL Preparations; showing plant-tissues, highly recommended as an excellent set, ...	[illegible]
A SERIES of WOOD SECTIONS, three on each slide (24 slides), showing complete structure. These are exquisitely cut, chiefly from American trees, . . .	[illegible]
BACTERIA, BACILLI, MICROCOCCI, pathogenic and innocuous 'microbes.') (See catalogue B.)	
A SERIES of 12 representative TEXTILE HAIRS AND FIBRES, animal and vegetable, ...	5 50
A SERIES of 24 WOOLS and other ANIMAL HAIRS AND FIBRES (Textile, ...	10 50

BOOKS.

3955. Practical Hints on the Selection and Use of the Microscope; by John Phin. 231 pp., illustrated. Including postage, ...	1 08
3964*a*. Common Objects for the Microscope; by J. G. Wood. With 12 excellent plates (uncolored) illustrating 400 objects. Including postage, .	[illegible]

ENTOMOLOGICAL SUPPLIES.

INSECT PINS, English white, Klaeger, white or black, Schlueter black, Carlesbadet white; per 100, 15c.; per 1000, ...	1 25
PINNING FORCEPS, ordinary, steel, ...	25

☞ Please refer to note on second page of cover.

PRICE.

PINNING FORCEPS, very heavy, finely made, two sizes (*a* and *b*), ... $1 50 and 2 50

SHEET CORK (3-16-inch thick, 12x3½ inches); in two grades, per doz., ... 75 and 1 25

BOTANICAL SUPPLIES.

COLLECTING CASE, large size, 15x8¼x4¼, with strap, . 1 75

COLLECTING CASE, smaller size, 12x7½x3½ do . 1 50

PLANT PRESS, size A, 12x18 in., with drying-paper, etc., 2 25

PLANT PRESS, size B, 10x14 in. do. do. 2 00

DRYING PAPER, size 18x24 (for doubling 12x18), per quire, 25c.; per ream, ... 4 40

DRYING PAPER, 12x18, very thick, per quire, 50c.; per ream, ... 7 50

Fine heavy "linen" MOUNTING PAPER, 11½x16½, per quire, 30c., per ream, ... 5 50

A good heavy MOUNTING PAPER, per quire 22c., per ream, ... 4 00

GENUS COVERS, very heavy, fine quality paper, 2¾½x 16¾, per sheet, 3c.; per 100, ... 2 25

☞ Please refer to note on second page of cover.

PRACTICAL NOTES AND TABLES.

GENERAL HINTS ON THE USE AND CARE OF THE MICROSCOPE.

If not properly cared for even the finest instrument will soon become disordered, and often seriously injured, become unsatisfactory to its owner, and bring discredit upon the maker. It therefore may be found useful to give as briefly as possible a few points regarding the proper care and use of a microscope.

In removing an eye-piece, or extending a draw-tube, take the outer tube firmly with one hand, and with the other extend the eye-piece or draw-tube steadily *without twisting*. This will prevent scratching.

The fitting parts (unlaquered) of eye-pieces, draw-tube, substage accessories, etc., should not be handled; or, if this should be unavoidable, they should be at once wiped off with a dry cloth to prevent tarnishing. If dirt should, however, accumulate it may usually be cleaned off with a little oil (kerosene or sperm is good), being careful to wipe off dry afterward; occasionally it may be necessary to use whiting (or better, Vienna lime), cleaning it off well finally. Emery must under no circumstances be used upon any part of the microscope, nor polishing powder of any kind upon the lenses or lacquered parts.

Lacquered parts may be simply wiped with a soft dry cloth or chamois skin in the direction of the 'grain;' or a little kerosene may be used if necessary. Kerosene is very useful as a general cleaning agent for the microscopist, and may be used alike on lacquered and unlacquered surfaces. It is excellent for the removal of balsam, being cleanly, easily used, and free from stickiness.

The lenses and mirrors may be occasionally cleansed with a soft, unstarched linen handkerchief (the older the better), using light pressure and a little moisture from the breath if necessary.

The *fronts* of objectives may be cleaned in this way, but it is generally better to send to us if any of the inner surfaces require cleaning. Eye-pieces may be taken apart for the purpose of cleaning, care being taken to replace each lens, as cleaned, in its proper place.

Should the coarse adjustment be found in course of time to work too easily, it may usually be remedied by tightening the two small screws acting upon the bearings of the pinion.

Ball and socket joints may readily be tightened by unscrewing the cap and adding a little packing *behind* the ball, taking care to screw up again sufficiently tight.

Once or twice every year the microscope body should be racked entirely out. The slide on the body, and the corresponding part of the arm, or bar, should then be thoroughly cleaned from all grease and dirt with a little watch oil, or good machine oil, which should finally be wiped off dry or very nearly so; the body may then be replaced. Attention to this one point will frequently make all the difference between a very rough working rack and a very smooth one.

In using the monocular microscope it is recommended to accustom one's self to keeping both eyes open, concentrating the attention upon the microscopic image. This may generally be done without effort, after some practice; and it will, we think, be found to be of advantage in the direction of avoiding a strain which is caused (in part) by the unequal use of the two eyes. The eye shade No. 3463 is a device which enables one to do this with greater ease. It has lately been suggested that the blank should be white instead of black; if found more suitable or agreeable, the manner of making the conversion neatly and permanently will readily suggest itself.

Do not use a brighter illumination than what is necessary to show the object clearly; the use of too intense an illumination is a fruitful source of injury to the sight. The light may be moderated, if necessary, especially with low powers, by the use of blue-tinted glass, ground-glass, tracing paper or the like, interposed between the lamp and mirror, or between mirror and diaphragm of the microscope, but a ground-glass or similar dispersive device should not be placed above the diaphragm.

In using immersion objectives, first find and centre the object by use of a low power objective, and then, before screwing the

objective upon the microscope, apply sufficient water to form a small bead large enough to cover the surface of the lens; then screw the objective in place, and focus until the water unites objective and object, when a perfect result will be obtained without difficulty. The principal advantages possessed by the immersion system for high-power objectives are: *1st*, the greatly increased working distance obtained; *2d*, the possibilty of a large increase of aperture over dry lenses; and *3d*, diminished sensibility to the disturbing influence of the cover glass (varying thicknesses) upon the corrections. Homogeneous immersion (or oil-immersion lenses possess these advantages in an increased degree; indeed, the effect of varying thicknesses of cover glass in causing aberrations is practically annulled, so that the collar adjustment is often entirely omitted in the finest objectives made on this system.

PRACTICAL POINTS IN HANDLING OBJECTIVES, TO OBTAIN BEST DEFINITION.

BY EDWARD PENNOCK.

If you want to compensate for thinner cover-glass, set the systems of your objective further apart; or the same purpose may be effected by lengthening the tube of your microscope. If, on the contrary, you want to correct for a thicker cover-glass, set the systems closer, or make your tube shorter. For convenience, the writer has drawn up the following table, showing the opposite action of different conditions:

These Conditions tend to OVER-CORRECTION.	*These Conditions tend to* UNDER-CORRECTION.
Thicker cover	Closing systems
Longer tube	Thinner cover
Opening systems	Shorter tube

For the recognition of under- or over-correction by the appearance of the object, the writer has found the method of F. Gundlach

(quoted in our foot note,* to be of great practical value; and he would urge careful practical study of these appearances as affording a guide to the kind of correction needed, whether "under" or "over."

To illustrate the practical use of this table, suppose, for example, a condition of under-correction of "general spherical aberration"; then either of the conditions named in the opposite column will afford counter-action or correction, *i. e.*, either thicker cover-glass, longer tube, or opening systems of objective, whichever may be most convenient or practicable. It is, of course, in many cases impossible to alter the distance of lens-systems, owing to the objective being in a fixed mount, not adjustable; in such cases one of the other correctives may be applied.—*Microscopical Bulletin, Aug. 1890.*

REMARKS ON USING OIL-IMMERSION OBJECTIVES.

In using these objectives cleanliness is important. Only a small quantity of the immersion fluid specially prepared cedar oil) should be used, and it should be wiped off as soon as possible when done using.

To remove the oil, blotting-paper should be used, and then, breathing on the front lens, wipe it lightly with a piece of clean, soft linen.

In order to keep the immersion fluid unchanged, it should not be exposed to the air for any length of time, as exposure to the air will thicken it, and so alter the refractive index.

*See article by E. Gundlach, reprinted in the MICROSCOPICAL BULLETIN for April, 1885; Mr. Gundlach there says that spherical under-correction "is, when present, most easily recognized in powerful objectives, and especially immersion objectives, by observing therewith objects with fine lines [for instance, the *P. angulatum*], as the lines of these appear to be not exactly in the plane of the outlines of the object, but somewhat below, so that after the outlines have been sharply defined, the objective has to be approached somewhat to the object by means of the fine adjustment, to bring out the lines in the sharpest manner. If however, it is necessary for the same purpose to move the objective further off, spherical over-correction is present.

"This test is applicable with more or less difficulty to all objectives, and with all such objects which show fine lines on the surface."

CARE OF OBJECTIVES AND EYE-PIECES.

Dust, moisture, or finger-marks on the lenses may be removed by breathing upon the lens and wiping with a clean, soft linen handkerchief (better than silk or chamois skin). Some kinds of glass, more than others, will attract moisture from the air, forming a film upon the surface of the lens, and causing the object to be shown with a lack of brilliancy or clearness, as through a mist. It is recommended to occasionally examine one's eye-pieces and objectives by holding them at about ten or twelve inches from the eye, toward a window, the image of which should be seen brightly and without haziness or dimness: if anything of the latter is noticed, one or more of the surfaces of the lenses will probably be found to require cleaning: in the case of an objective we recommend to send it to the maker, but if not convenient to do this, unscrew the various lenses, carefully clean as above directed and replace them, being careful to screw each lens-mounting firmly, though not too tightly, to its seat again.

A PRACTICAL NOTE ON CORRECTION FOR COVER AND TUBE-LENGTH.

BY EDWARD PENNOCK.

It may be remarked that objectives of high power, dry or water-immersion (say ⅓ inch and upwards), may be used advantageously with a different tube-length from that for which they are corrected, by using a cover-glass thicker or thinner, which compensates by introducing an opposite aberration. For example:

To use an objective that is corrected for a short tube, upon a microscope having a *long tube*, use a *thinner cover-glass* upon your object.

To use an objective that is corrected for a long tube, upon a microscope having a *short tube*, use a *thicker cover-glass* upon your object.

To use an objective that is corrected for a certain thickness of cover-glass with a *thinner cover-glass, lengthen the tube* of your microscope.

To use an objective that is corrected for a certain thickness of cover-glass, with a *thicker cover-glass, shorten the tube* of your microscope.

TABLE OF COLOR-CORRECTIONS.

By Edward Pennock.

	Within Focus	Without Focus.
Under-correction.	Brick Red	Greenish Blue
Slightly under—(but a large number of the finest lenses have this color).	Claret	Light Green
Nearly colorless—shows the *secondary spectrum.*	Lilac	Paler Green
Over-corrected.	Blue	Yellow

—*The Microscopical Bulletin.*

NUMERICAL APERTURE TABLE.

(*Abridged from Journal of the Royal Microscopical Society.*)

The "APERTURE" of an optical instrument indicates its greater or less capacity for receiving rays from the object and transmitting them to the image, and the aperture of a microscope objective is therefore determined by the ratio between its focal length and the diameter of the emergent pencil at the plane of its emergence—that is, the utilized diameter of a single-lens objective or of the back lens of a compound objective.

This ratio is expressed for all media and in all cases by $n \sin u$, n being the refractive index of the medium and u the semi-angle of aperture. The value of $n \sin u$ for any particular case is the "*numerical aperture*" of the objective.

Diameters of the Back lenses of various Dry and Immersion Objectives of the same Power (¼ in. from 0.50 to 1.52 N.A.	Numerical Aperture. ($n \sin u = a$).	Angle of Aperture ($= 2u$.)		
		Dry Objectives. ($n = 1$.)	*Water-Immersion Objectives.* ($n = 1.33$.)	*Homo-Immersion Objectives.* ($n = 1.52$.)
	1.52	...	...	180° 0′
1.52 N. A.=	**1.40**	...	...	134° 10′
.76 in. diam.	**1.36**	...	...	126° 57′
1.33 N. A.=	**1.33**	...	180° 0′	122° 6′
.66 in. diam.	**1.28**	...	148° 28′	114° 44′
1.16 N. A.=	**1.24**	...	137° 36′	109° 20′
.58 in. diam.	**1.20**	...	128° 55′	104° 15′
	1.16	...	121° 26′	99° 29′
1.00 N. A.	**1.12**	...	114° 44′	94° 56′
.50 in. diam.	**1.08**	...	108° 36′	90° 33′
	1.04	...	102° 53′	86° 21′
.96 N. A.	**1.00**	180° 0′	97° 31′	82° 17′
.48 in. diam.	**0.96**	147° 29′	92° 24′	78° 20′
.92 N. A.	**0.92**	133° 51′	87° 32′	74° 30′
.46 in. diam.	**0.88**	123° 17′	82° 51′	70° 44′
	0.84	114° 17′	78° 20′	67° 6′
.70 N. A.	**0.80**	106° 16′	73° 58′	63° 31′
.35 in. diam.	**0.76**	98° 56′	69° 42′	60° 0′
.60 N. A.	**0.72**	92° 6′	65° 32′	56° 32′
.30 in. diam.	**0.68**	85° 41′	61° 30′	53° 9′
	0.64	79° 35′	57° 31′	49° 48′
.50 N. A.	**0.60**	73° 44′	53° 38′	46° 30′
.25 in. diam.	**0.56**	68° 6′	49° 48′	43° 14′
	0.50	60° 0′	44° 10′	38° 24′

TABLE OF MAGNIFYING POWERS.

THE ANNEXED TABLE of magnifying powers is reprinted in an abridged form, from the *Journal of the Royal Microscopical Society*. It is calculated upon the simple rule that the magnifying power of the eye-piece alone, multiplied by the power of the objective alone, equals the magnifying power of the combination with standard *ten-inch tube*.*

For every inch longer (or shorter) tube, add (or subtract) ten per cent. to (or from) the power given.

Objective	EYE-PIECE.				
DENOMINATION BY EQUIVALENT FOCAL LENGTH.	No. 1 or A (nearly).	No. 2 or B (nearly).	No. 3 or C (nearly).		No. 4 or D nearly.
	FOCAL LENGTH.				
	2 in.	1¼ in.	1 in.	⅝ in.	½ in.
Inches.					
3	16⅔	25	33⅓	50	66⅔
2	25	37½	50	75	100
1½	33⅓	50	66⅔	100	133½
1	50	75	100	150	200
¾	66⅔	100	133⅓	200	266⅔
⅔	75	112½	150	225	300
½	100	150	200	300	400
4/10	125	187½	250	375	500
⅓	150	225	300	450	600
¼	200	300	400	600	800
⅕	250	375	500	750	1000
1/6	300	450	600	900	1200
⅛	400	600	800	1200	1600
1/10	500	750	1000	1500	2000
1/12	600	900	1200	1800	2400
1/15	750	1125	1500	2250	3000
1/18	900	1350	1800	2700	3600

*It is a well-known rule that where the equivalent focal length of any lens or combination of lenses is known, its power is at once obtained by dividing this distance (in inches) into ten (ins.) Thus a one-quarter inch lens or combination magnifies forty diameters. Conversely, the equivalent focal length is obtained where the power is known.

IMPORTANT ANNOUNCEMENT.

We are gratified to state that arrangements have been completed, and contracts signed, by which we have been appointed

SOLE AGENTS

FOR THE

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So celebrated in the laboratories of Europe.

N. B.—All correspondence in regard to the instruments of this maker should be addressed to us in order to save delay, as all business and inquiries are referred to us by Mr. Reichert for our attention.

IMPORTING INSTRUMENTS FREE OF DUTY.

By authority of Act of Congress, colleges and schools of the United States are permitted to import *free of duty*. Scientific Instruments to be used in connection with the educational exercises of the institution for which they are ordered.

We shall be pleased to execute such import orders, or to give estimates or other information.

Respectfully,
JAMES W. QUEEN & CO.

New Jersey Agricultural College Experiment Station.

New Brunswick, N. J., July 18th, 1891.

GENTLEMEN: Yours of the 15th inst. at hand. I have just had an opportunity to test the new Reicherts, and find them perfectly satisfactory. The lenses, objectives and oculars, are as much alike as possible, all clean and with excellent definition. The workmanship is good throughout; the motion of the coarse and fine adjustments easy and smooth, and the make-up as a whole attractive. I am greatly pleased with the stand and have no doubt it will answer excellently well for our laboratory work. I have no objection to you referring to me if you desire to do so.

Yours, etc.,
JOHN B. SMITH, *Entomologist.*

(Above refers to 6 Microscopes No. III, with Abbe Condenser, etc., outfit No. 213.)

REDUCED PRICE-LIST

—OF—

GLASS SLIDES AND COVER GLASSES.

GLASS SLIDES.

No.	Per doz.	Per gross.	In 10 gro. lots, per gross
3680	$0.10	$0.75	$0.60
3681	.15	1.30	1.00
3681a	.25	2.00	1.60
3681b	.25	2.00	1.60
3683	.20	1.50	1.20
3683½	.25	2.00	1.60
3684	.10	.75	. .
3685	.15	1.30	. .

COVER GLASSES.

No.	Per doz.	Per oz.	In 10 oz. lots, Per oz.
3693a, No. 1	. .	$1.00	. .
3693b " 2	. .	.65	. .
3693c " 3	. .	.50	. .
3694 " 3 sq.	$0.12	.80	$0.65
3695 " 2 "	.15	1.10	.95
3695a " 2 rect.	.15	1.10	.95
3696 " 1 sq.	.18	1.45	1.30
3697 " 3 circ.	.15	1.10	.95
3698 " 2 "	.18	1.45	1.30
3699 " 1 "	.20	1.80	1.60

Respectfully,

JAMES W. QUEEN & CO.

Philadelphia, Nov. 10th, 1892.

REDUCED PRICE-LIST

—OF—

GLASS SLIDES AND COVER GLASSES.

GLASS SLIDES.

No.	Per doz.	Per gross.	In 10 gro. lots, per gross
3680	$0.10	$0.75	$0.60
3681	.15	1.30	1.00
3681a	.25	2.00	1.60
3681b	.25	2.00	1.60
3683	.20	1.50	1.20
3683½	.25	2.00	1.60
3684	.10	.75	. .
3685	.15	1.30	. .

COVER GLASSES.

No.	Per doz.	Per oz.	In 10 oz. lots, Per oz.
3693a, No. 1	. .	$1.00	. .
3693b " 2	. .	.65	. .
3693c " 3	. .	.50	. .
3694 " 3 sq.	$0.12	.80	$0.65
3695 " 2 "	.15	1.10	.95
3695a " 2 rect.	.15	1.10	.95
3696 " 1 sq.	.18	1.45	1.30
3697 " 3 circ.	.15	1.10	.95
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JAMES W. QUEEN & CO.

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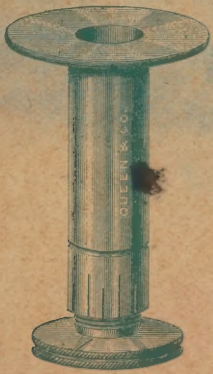

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Prof. J. H. Wythe, M. D.,

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(a hand-book of microscopy), writes under date of November 29th, 1891:

"The twenty Acme Microscopes (No. 5, Rack and Pinion), obtained from you for my department (Histology) in Cooper Medical College, San Francisco, after a year's work in the laboratory, GIVE COMPLETE SATISFACTION.

Signed,

J. H. WYTHE.